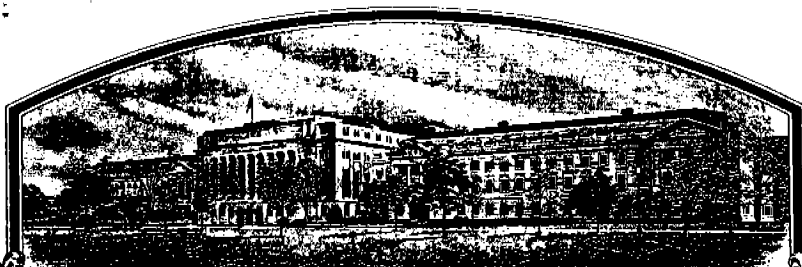


No.

7700004



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Western Plant Breeders

Whereas, THERE HAS BEEN PRESENTED TO THE  
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *seventeen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Reliance'

In Testimony Whereof, I have hereunto set  
my hand and caused the seal of the Plant  
Variety Protection Office to be affixed  
at the City of Washington  
this 11th day of April in  
the year of our Lord one thousand nine  
hundred and seventy-seven

Attest:

*[Signature]*  
Commissioner  
Plant Variety Protection Office  
Grain Division  
Agricultural Marketing Service

*[Signature]*  
Secretary of Agriculture



## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: See Reverse.

1. VARIETY NAME OR TEMPORARY DESIGNATION  Reliance	2. KIND NAME  Barley	FOR OFFICIAL USE ONLY PV NUMBER 7700004	
3. GENUS AND SPECIES NAME  Hordium vulgare	4. FAMILY NAME (Botanical)  Gramineae 5. DATE OF DETERMINATION  May 20, 1975	FILING DATE 10-22-76 FEE RECEIVED \$ 250.00 \$ 250.00 \$ 250.00	TIME 12:45 A.M. P.M. BALANCE DUE \$ 12-7-76
6. NAME OF APPLICANT(S)  Western Plant Breeders W.P.B. ACQUISITION INC. WESTERN PLANT BREEDERS, INC. (a Maryland corporation)	7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) Rt. 3, Box 45B 1916 VAN BUREN Conrad, Montana 59425 P.O. Box 1110 ATTN: MR. ROBERT HUNTINGTON PHOENIX, AZ 85001		8. TELEPHONE AREA CODE AND NUMBER 406 278-5547
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (Corporation, partnership, association, etc.) Partnership	10. STATE OF INCORPORATION	11. DATE OF INCORPORATION	

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:

Dr. A. E. Carleton, President - Western Plant Breeders  
Rt. 3, Box 45B  
Conrad, Montana 59425

## 13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- ☒ 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
- ☒ 13B. Exhibit B, Botanical Description of the Variety
- ☒ 13C. Exhibit C, Objective Description of the Variety
- ☒ 13D. Exhibit D, Data Indicative of Novelty
- ☒ 13E. Exhibit E, Statement of the Basis of Applicant's Ownership

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? (See Section 83(a). (If "Yes," answer 14B and 14C below.) ☒ YES ☐ NO14B. Does the applicant(s) specify that this variety be limited as to number of generations? ☒ YES ☐ NO14C. If "Yes," to 14B, how many generations of production beyond breeder seed? ☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

(DATE)

(SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

00001

- 13A. The original basic germplasm was obtained from Dr. T. R. Ramage's (ARS, USDA) barley breeding program at Tucson, Arizona. Reliance was selected from a broad based male-sterile facilitated recurrent selection population which contained crosses of Southwestern United States adapted germplasm and short strawed genotypes to the world collection of barley. The original crossing was done in 1971 among the material obtained from Dr. Ramage. The  $F_1$  thru  $F_6$  generations were grown in the winter in Arizona and in the summer in Montana. Reliance was selected in the  $F_5$  generation from a group of 30  $F_5$  lines being grown in Arizona. Five plants were pulled from the  $F_5$  line and grown in Montana in 1975. Three plant rows that were uniform in morphological traits such as plant height, plant color, head color (yellow in the soft dough), head type, and maturity were selected. Seed from these three plant rows was bulked as the basic seed stock of Reliance. This basic seed was seeded in Arizona in 1975-76 to produce Breeders seed.

The major variants observed during the selection and multiplication stages have been tall out-crossed hybrid plants. Most of these out-crosses have been two-rowed plants. These variants have been removed thru roguing however out-crossing may occur in later generations. These out-crossed variants will be hybrids and range from 5" to 12" taller than Reliance.

Since Reliance was selected in the  $F_5$  generation and basic seed was from  $F_6$  plant rows, genetic stability based on self-pollination and homozygosity levels in the  $F_6$  generation will provide varietal stability. Basic seed, Breeders seed, and Foundation seed have been produced and no abnormal change in morphological or physiological traits have been observed.

- 13B. The seed of Reliance is thin-hulled with many kernels being partly hulled during the threshing operation. Reliance has blue aleurone color.

Reliance has semi-prostrate early plant growth with broad light green leaves. Field plantings of Reliance have a yellow cast until maturity which is different from all other barley varieties currently being grown in the Southwest.

The mature plants of Reliance are semi-dwarfs with upright club heads. Reliance will be shorter than CM 67 grown under similar conditions (See Data sheet on plant heights). Reliance has much stiffer straw than Arivate or CM 67. Reliance has similar height and straw strength as the WPB's variety Gus. Gus and Reliance can be distinguished by plant color (Gus-green, Reliance-yellow), head type (Gus-normal, Reliance-club), and seed (Gus-yellow hull, light blue aleurone; Reliance-brownish seed color with dark blue aleurone--see seed samples for Gus and Reliance).

- 13C. See Insert

- ~~13D. Reliance can be segregated from other barley varieties by plant height (See Table I). Reliance ranges from 28.6 cm shorter than Arivate to 15 cm shorter than CM 67. Reliance is thus considerably shorter than the other club varieties and also shorter than normal head type barleys grown in the Southwest.~~

225  
1/24/77

7700004

Date of Determination. Both varieties were determined at a meeting on May 20, 1975. The 1976 date for 'Gus' was a typing error.

(ADDENDUM) 1/24/77 ~~scs~~

Exhibit A. The frequency of variants in 'Gus' barley was less than 1 in 8 to 10,000 plants. The frequency of variants in 'Reliance' barley was less than 1 in 15 to 20,000 plants.

00003

OBJECTIVE DESCRIPTION OF VARIETY  
BARLEY (HUMULUS VULGARE)

INSTRUCTIONS: See Reverse

NAME OF APPLICANT(S)

Western Plant Breeders

Address, Street and No. or P.O. No., City, State, and ZIP Code  
Valley Seed Co., Box 1110, Phoenix, Arizona 85026  
Montana Seeds, Inc., Rt. 3, Conrad, Montana 95425

FOR OFFICIAL USE ONLY

PVPO NUMBER

7700004

VARIETY NAME OR TEMPORARY  
DESIGNATION

Reliance or 4-3; 4-3Y; V4-3

Place the appropriate number that describes the varietal character of this variety in the boxes below.

Enter a zero in first box (0 8 9) or (0 9) when number is either 99 or less or 9 or less.

## 1. GROWTH HABIT

1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER 2 Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE  
3 = ERECT

## 2. MATURITY (50% Flowering)

1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

8 No. of days from start of flowering to maturity } 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON  
6 No. of days from start of flowering to maturity } 5 = PIROLINE 6 = PRIMUS 7 = UNITAN

## 3. PLANT HEIGHT (From soil level to top of head):

1 = SHORT (California Mariout) 2 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

0 8 No. of days from start of flowering to maturity } 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON  
x No. of days from start of flowering to maturity } 5 = PIROLINE 6 = PRIMUS 7 = UNITAN  
x = Taller than none listed

## 4. STEM

3 Thickness of stem at maturity 1 = 0 - 3 cm. 2 = 3 - 10 cm. 1 Anthocyanin 1 = ABSENT 2 = PRESENT  
3 = 10 - 15 cm.

0 4 NO. OF NODS (Nod. originating from node above ground)

1 Shape of stem 1 = CLOSED 2 = V-SHAPED 3 = OPEN 1 Shape of Neck 1 = STRAIGHT 2 = SNAKY  
4 = MODIFIED CLOSED OR OPEN 3 = OTHER (Specify)

## 5. LEAF

1 Blade leaf surface (under) 1 = GLABROUS 2 = PUBESCENT 1 Position of flag leaf (at boot stage) 1 = DROOPING  
2 = UPRIGHT

2 Waxiness 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 2 5 MM. WIDTH (First leaf below flag leaf)

2 9 CM. LENGTH (First leaf below flag leaf) 1 Anthocyanin in leaf sheath 1 = ABSENT 2 = PRESENT

## 6. HEAD

2 Type 1 = TWO-ROWED 2 = SIX-ROWED 3 Density: 1 = LAX 2 = ERECT (Not dense)  
3 = ERECT (Dense)4 Shape 1 = TAPERING 2 = STRAP 3 = CLAVATE 2 Waxiness 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY  
4 = OTHER (Specify) Club 3 = WAXY3 Lateral Remy 1 = NONE 2 = AT TIP 3 Rachis (Fls. on edge) 1 = LACKING 2 = FEW 3 = COVERED  
3 = 1/4 - 1/2 OF HEAD

## 7. GLUME

1 Length 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA 2 Hairs: 1 = NONE 2 = SHORT 3 = LONG  
3 = MORE THAN 1/2 OF LEMMA

4 Hairs 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

3 Awns 1 = SHORTER THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES  
3 = LONGER THAN EQUAL TO LENGTH OF GLUMES

3 Awn Surface 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

00004

## 8. LEMMA:

☐ 5 Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS  
 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)  
 5 = LONG (longer than spike) 6 = HOODED

☐ 3 Awn Surface: 0 = AWNLESS 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

☐ 1 Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS ☐ 1 Hair: 1 = ABSENT 2 = PRESENT

☐ 2 Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE ☐ 2 Rachilla Hairs: 1 = SHORT 2 = LONG

## 9. STIGMA:

☐ 2 Hairs: 1 = FEW 2 = MANY

## 10. SEED:

☐ 2 Type: 1 = NAKED 2 = COVERED ☐ 1 Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

☐ 2 Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)  
 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

☐ 3 Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

☐ 2 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

less ☐ 1% PERCENT ABORTIVE

☐ 4 ☐ 9 GMS. PER 1000 SEEDS

## 11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

<input type="checkbox"/> 0 SEPTORIA	<input type="checkbox"/> 1 NET BLOTCH	<input type="checkbox"/> 1 SPOT BLOTCH	<input type="checkbox"/> 2 POWDERY MILDEW
<input type="checkbox"/> 1 LOOSE SMUT	<input type="checkbox"/> 1 BACTERIAL BLIGHT	<input type="checkbox"/> 1 COVERED SMUT	<input type="checkbox"/> 0 FALSE LOOSE SMUT
<input type="checkbox"/> 0 STEM RUST	<input type="checkbox"/> 0 LEAF RUST	<input type="checkbox"/> 0 SCAB	<input type="checkbox"/> 0 SCALD
<input type="checkbox"/> 0 AY	<input type="checkbox"/> 1 BSMV	<input type="checkbox"/> 1 BYDV	<input type="checkbox"/> 0 OTHER (Specify)

## 12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

<input type="checkbox"/> 0 GREEN BUG	<input type="checkbox"/> 0 ENGLISH GRAIN APHID	<input type="checkbox"/> 0 CHINCH BUG	<input type="checkbox"/> 0 ARMYWORM
<input type="checkbox"/> 0 GRASS HOPPERS	<input type="checkbox"/> 0 CERIAL LEAF BETTLE	<input type="checkbox"/> 0 OTHER (Specify)	
HESSIAN FLY RACES		<input type="checkbox"/> 0 GP	<input type="checkbox"/> 0 A
		<input type="checkbox"/> 0 B	<input type="checkbox"/> 0 C
		<input type="checkbox"/> 0 D	<input type="checkbox"/> 0 E
		<input type="checkbox"/> 0 F	<input type="checkbox"/> 0 G

## 13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 DDT ☐ 0 OTHER (Specify)

## 14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	California Mariout	Seed size	Ariyate
Leaf size	California Mariout	Coleoptile elongation	California Mariout
Leaf color	None	Seedling pigmentation	None
Leaf carriage	California Mariout		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961. Classification of Barley Varieties Grown in the United States and Canada in 1958. Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968. Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests. Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malin, Barley Improvement Association, Milwaukee, Wisconsin, 1971. Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

## 'Reliance'

Exhibit D. 'Reliance' is most similar to 'CM 67' but differs in that 'Reliance' flowers and matures an average of 5 days later, is 15 cm shorter, and has stronger straw which is more resistant to lodging than 'CM 67'. 'Reliance' has brownish thin hulls and dark blue aleurone color while 'CM 67' has white hulls and white aleurone color.

Exhibit E. Western Plant Breeders, a partnership, is the developer and sole owner of 'Reliance' barley.

TABLE 1. Plant Height (in cm) Comparisons at Several Locations

Variety	Mesa Trial 1	Mesa Trial 2	Stockton	El Central	$\bar{x}$
Reliance	76.2	71.1	68.3	63.5	69.8
Arivate	126.7	94.0	91.4	101.6	98.4
Kombar	88.9	83.8	82.1	81.3	84.0
CM 67	-	-	80.7	88.9	84.8
Gus	81.3	76.2	71.3	71.1	75.0
LSD .05			3.0 cm	8.2 cm	

TABLE 2. Straw Strength as Lodging Percentage at Several Locations

Variety	Mesa Trail 1	Mesa Trail 2	Stockton	El Central	$\bar{x}$
Reliance	10	1	5	10	6.5
Arivate	68	37	49	60	53.5
Kombar	1	0	1	10	3.0
CM 67	--	--	75	95	85.0
Gus	2	1	1	5	2.2
Signal	--	--	82	98	87.0
LSD .05			10%	6%	

STATE OF ARIZONA        }  
County of Maricopa    ) ss.

ASSIGNMENT

WHEREAS, WESTERN PLANT BREEDERS, INC., an Arizona corporation (a/k/a) WESTERN PLANT BREEDERS), having its principal place of business at Phoenix, Arizona, has adopted, used and is using the following Certificate of Protection which is registered in the Plant Variety Protection Office of the Secretary of Agriculture:

Certificate No. 7700004                      Reliance                      Barley

WHEREAS, WPB ACQUISITION INC., a Maryland corporation, having its principal place of business in Hayward, California, is desirous of acquiring said Plant Variety Protection Certificate; and

WHEREAS, WESTERN PLANT BREEDERS, INC., states that it has title to the above Certificate and that this transfer does not violate any applicable ruling or order of any court or agency of competent jurisdiction.

NOW, THEREFORE, for valuable consideration, receipt of which is hereby acknowledged, WESTERN PLANT BREEDERS, INC. does hereby assign and set over to WPB ACQUISITION INC., all of the right, title and interest of WESTERN PLANT BREEDERS, INC., in and to the variety of barley named:

"Reliance"

together with all goodwill associated with that variety and that name, and together with all rights under and to that Certificate of Plant Variety Protection, No. 7700004, issued by the Secretary of Agriculture of the United States of America on April 11, 1977.

WESTERN PLANT BREEDERS, INC.

By Albert E. Carleton  
Albert E. Carleton, President

On this 30th day of September, 1985, before me, appeared Albert E. Carleton, to me personally known, who, being by me duly sworn, did say that he is the president of WESTERN PLANT BREEDERS, INC., an Arizona corporation, and that the foregoing Assignment is on behalf of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal at my office in Phoenix, Arizona the day and year last above written.

Giovanna M. Baltes  
Notary Public

My Commission Expires:

November 3, 1986

Working Copy

Reliance

- 13A. The original basic germplasm was obtained from Dr. T. R. Ramage's (ARS, USDA) barley breeding program at Tucson, Arizona. Reliance was selected from a broad based male-sterile facilitated recurrent selection population which contained ~~crosses~~ <sup>crosses</sup> of Southwestern United States adapted germplasm and short strawed genotypes to the world collection of barley. The original crossing was done in 1971 among the material obtained from Dr. Ramage. The F<sub>1</sub> thru F<sub>6</sub> generations were grown in the winter in Arizona and in the summer in Montana. Reliance was selected in the F<sub>5</sub> generation from a group of 30 F<sub>5</sub> lines being grown in Arizona. Five plants were pulled from the F<sub>5</sub> line and grown in Montana in 1975. Three plant rows that were uniform in morphological traits such as plant height, plant color, head color (yellow in the soft dough), head type, and maturity were selected. Seed from these three plant rows was bulked as the basic seed stock of Reliance. This basic seed was seeded in Arizona in 1975-76 to produce Breeders seed.

The major variants observed during the selection and multiplication stages have been tall out-crossed hybrid plants. Most of these out-crosses have been two-rowed plants. These variants have been removed thru roguing however out-crossing may occur in later generations. These out-crossed variants will be hybrids and range from 5" to 12" taller than Reliance.

Since Reliance was selected in the F<sub>5</sub> generation and basic seed was from F<sub>6</sub> plant rows, genetic stability based on self-pollination and homozygosity levels in the F<sub>6</sub> generation will provide varietal stability. Basic seed, Breeders seed, and Foundation seed have been produced and no abnormal change in morphological or physiological traits have been observed.

- 13B. The seed of Reliance is thin-hulled with many kernals being partly hulled during the threshing operation. Reliance has blue aleurone color.

Reliance has semi-prostrate early plant growth with broad light green leaves. Field plantings of Reliance have a yellow cast until maturity which is different from all other barley varieties currently being grown in the Southwest.

The mature plants of Reliance are semi-dwarfs with upright club heads. Reliance will be shorter than CM 67 grown under similar conditions (See Data sheet on plant heights). Reliance has much stiffer straw than Arivate or CM 67. Reliance has similar height and straw strength as the WPB's variety Gus. Gus and Reliance can be distinguished by plant color (Gus-green, Reliance-yellow), head type (Gus-normal, Reliance-club), and seed (Gus-yellow hull, light blue aleurone; Reliance-brownish seed color with dark blue aleurone--see seed samples for Gus and Reliance).

- 13C. See Insert

- 13D. Reliance can be segregated from other barley varieties by plant height (See Table 1). Reliance ranges from 28.6 cm shorter than Arivate to 15 cm shorter than CM 67. Reliance is thus considerably shorter than the other club varieties and also shorter than normal head type barleys grown in the Southwest.

- 13D. Reliance can be separated from other barley varieties by head type. Reliance has a club head similar to Signal and CM 67, but plants of Reliance are shorter than Signal or CM 67.

Reliance can be separated from other club headed varieties by straw strength (See Table 2). Reliance had an average lodging percentage of 6.5 while CM 67 and Signal had lodging percentages in the same trials of 85 and 87 respectively.

A seed sample of Reliance showing the brownish color, thin hull, dark blue aleurone color and partial hulling has been enclosed.

- 13E. The applicant is Western Plant Breeders which is the employer of Dr. A. E. Carleton and Mr. William Corpstein, Jr. who are the barley breeders.

OBJECTIVE DESCRIPTION OF VARIETY  
BARLEY (*HORDEUM VULGARE*)

INSTRUCTIONS See Reverse

NAME OF APPLICANT		FOR OFFICIAL USE ONLY	
<p>Western Plant Breeders</p> <p>Valley Seed Co., Box 1110, Phoenix, Arizona 85026</p> <p>Montana Seeds, Inc., Rt. 3, Conrad, Montana 95425</p>		<p>PIPO NUMBER</p> <p>VARIETY NAME OR TEMPORARY DESIGNATION Reliance or 4-3; 4-3Y; V4-3</p>	
<p>1. The number in the box that describes the varietal character of this variety in the boxes below.                  2. The number in the box that describes the varietal character of this variety in the boxes below.                  3. The number in the box that describes the varietal character of this variety in the boxes below.</p>			
<p>1. GROWTH HABIT</p> <p>1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER 4 = Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT</p>			
<p>2. MATURITY (50% Flowering)</p> <p>1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)</p>			
<p>3. SEED CHARACTERISTICS</p> <p>1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON</p> <p>5 = PIROLINE 6 = PRIMUS 7 = UNITAN</p>			
<p>4. PLANT HEIGHT (from soil level to top of head)</p> <p>1 = SEMI-DWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)</p>			
<p>5. SEEDLING CHARACTERISTICS</p> <p>1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON</p> <p>5 = PIROLINE 6 = PRIMUS 7 = UNITAN</p> <p>X = Taller than none listed</p>			
<p>6. STEM</p> <p>1 = 0-5 cm 2 = 5-10 cm 3 = 10-15 cm</p> <p>1 = Absent 2 = PRESENT</p>			
<p>7. LEAF CHARACTERISTICS</p> <p>1 = STRAIGHT 2 = SNAKY</p> <p>3 = OTHER (Specify)</p>			
<p>8. LEAF</p> <p>1 = GLABROUS 2 = PUBESCENT</p> <p>1 = DROOPING 2 = UPRIGHT</p>			
<p>9. WAXINESS</p> <p>1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY</p> <p>2 = 5 MM WIDTH (First leaf below flag leaf)</p>			
<p>10. ANTHODIUMS</p> <p>1 = ABSENT 2 = PRESENT</p>			
<p>11. HEAD</p> <p>1 = TYPE 2 = SIX ROWED</p> <p>3 = DENSE 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense)</p>			
<p>12. SHAPE</p> <p>1 = SPREADING 2 = STRAP 3 = CLAVATE 4 = CLUB</p> <p>2 = WAXINESS 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY</p>			
<p>13. LEMMA CHARACTERISTICS</p> <p>1 = NONE 2 = AT TIP 3 = 1/4 2 OF HEAD</p> <p>3 = RACHIS OF LEAF EDGES 1 = LACKING 2 = FEW 3 = COVERED</p>			
<p>14. GLUME</p> <p>1 = TYPE 2 = 1/2 OF LEMMA 3 = MORE THAN 1/2 OF LEMMA</p> <p>2 = HAIR 1 = NONE 2 = SHORT 3 = LONG</p>			
<p>15. HAIR</p> <p>1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED</p>			
<p>16. AXYL</p> <p>1 = SHORTER THAN LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES 3 = LONGER THAN LENGTH OF GLUMES</p>			
<p>17. AXYL SURFACE</p> <p>1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH</p>			

## 8. LEMMA:

☐ 5 Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS  
 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)  
 5 = LONG (longer than spike) 6 = HOODED

☐ 3 Awn Surface: 0 = AWNLESS 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

☐ 1 Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS

☐ 1 Hair: 1 = ABSENT 2 = PRESENT

☐ 2 Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE  
 3 = TRANSVERSE CREASE

☐ 2 Rachilla Hairs: 1 = SHORT 2 = LONG

## 9. STIGMA:

☐ 2 Hairs: 1 = FEW 2 = MANY

## 10. SEED:

☐ 2 Type: 1 = NAKED 2 = COVERED

☐ 1 Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

☐ 2 Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)  
 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

☐ 3 Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

☐ 2 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

less ☐ 1% PERCENT ABORTIVE

☐ 4 ☐ 9 GMS. PER 1000 SEEDS

## 11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

<input type="checkbox"/> 0 SEPTORIA	<input type="checkbox"/> 1 NET BLOTCH	<input type="checkbox"/> 1 SPOT BLOTCH	<input type="checkbox"/> 2 POWDERY MILDEW
<input type="checkbox"/> 1 LOOSE SMUT	<input type="checkbox"/> 1 BACTERIAL BLIGHT	<input type="checkbox"/> 1 COVERED SMUT	<input type="checkbox"/> 0 FALSE LOOSE SMUT
<input type="checkbox"/> 0 STEM RUST	<input type="checkbox"/> 0 LEAF RUST	<input type="checkbox"/> 0 SCAB	<input type="checkbox"/> 0 SCALD
<input type="checkbox"/> 0 AY	<input type="checkbox"/> 1 BSMV	<input type="checkbox"/> 1 BYDV	<input type="checkbox"/> 0 OTHER (Specify)

## 12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

<input type="checkbox"/> 0 GREEN BUG	<input type="checkbox"/> 0 ENGLISH GRAIN APHID	<input type="checkbox"/> 0 CHINCH BUG	<input type="checkbox"/> 0 ARMYWORM								
<input type="checkbox"/> 0 GRASS HOPPERS	<input type="checkbox"/> 0 CERIAL LEAF BEETLE	<input type="checkbox"/> 0 OTHER (Specify)									
HESSIAN FLY RACES { <table border="0" style="display: inline-table; vertical-align: middle;"> <tbody> <tr> <td><input type="checkbox"/> 0 GP</td> <td><input type="checkbox"/> 0 A</td> <td><input type="checkbox"/> 0 B</td> <td><input type="checkbox"/> 0 C</td> </tr> <tr> <td><input type="checkbox"/> 0 D</td> <td><input type="checkbox"/> 0 E</td> <td><input type="checkbox"/> 0 F</td> <td><input type="checkbox"/> 0 G</td> </tr> </tbody> </table>				<input type="checkbox"/> 0 GP	<input type="checkbox"/> 0 A	<input type="checkbox"/> 0 B	<input type="checkbox"/> 0 C	<input type="checkbox"/> 0 D	<input type="checkbox"/> 0 E	<input type="checkbox"/> 0 F	<input type="checkbox"/> 0 G
<input type="checkbox"/> 0 GP	<input type="checkbox"/> 0 A	<input type="checkbox"/> 0 B	<input type="checkbox"/> 0 C								
<input type="checkbox"/> 0 D	<input type="checkbox"/> 0 E	<input type="checkbox"/> 0 F	<input type="checkbox"/> 0 G								

## 13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 DDT ☐ 0 OTHER (Specify)

## 14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	California Mariout	Seed size	Arivate
Leaf size	California Mariout	Coleoptile elongation	California Mariout
Leaf color	None	Seedling pigmentation	None
Leaf carriage	California Mariout		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961. Classification of Barley Varieties Grown in the United States and Canada in 1954. Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968. Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Past, Agr. Gene Handbook No. 338, U.S. Dept. of Agriculture, pp. 61-84.
3. Malin, Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

TABLE 1. Plant Height (in cm) Comparisons at Several Locations

Variety	Mesa Trial 1	Mesa Trial 2	Stockton	El Central	$\bar{x}$
Reliance	76.2	71.1	68.3	63.5	69.8
Arivate	126.7	94.0	91.4	101.6	98.4
Kombar	88.9	83.8	82.1	81.3	84.0
CM 67	—	—	80.7	88.9	84.8
Gus	81.3	76.2	71.3	71.1	75.0
LSD .05			3.0 cm	8.2 cm	

TABLE 2. Straw Strength as Lodging Percentage at Several Locations

Variety	Mesa Trail 1	Mesa Trail 2	Stockton	El Central	$\bar{x}$
Reliance	10	1	5	10	6.5
Arivate	68	37	49	60	53.5
Kombar	1	0	1	10	3.0
CM 67	—	—	75	95	85.0
Gus	2	1	1	5	2.2
Signal	—	—	82	98	87.0
LSD .05			10%	6%	

In ECT's  
exhibit 1992

SEARCH VERIFICATION

The applicant states that 'Reliance' is most similar to 'CM 67' but differs in that 'Reliance' flowers and matures an average of 5 days later, is 15 cm shorter and has stronger straw which is more resistant to lodging than that of 'CM 67'. 'Reliance' has brownish, thin hulls and dark blue aleurone color while 'CM 67' has white hulls and white aleurone color. (Exhibit D of application)

A computer comparison of 'Reliance' and 'CM 67' shows that 'Reliance' is semidwarf in height and has a blue aleurone. 'Reliance' is susceptible to barley yellow dwarf virus and net blotch and resistant to powdery mildew. (Exhibits B, C, and D of application) 'CM 67' is short in height and has a white aleurone. 'CM 67' is "highly tolerant" to barley yellow dwarf virus, "moderately tolerant" to net blotch and susceptible to powdery mildew. (Crop Science 9: 521; Calif. Agric. 28(9): 14-15; Calif. Agric. 24(4): 4-6; Ariz. Ext. Serv. Bull. A-15 and "Know your 1975 malting barley varieties", MBIA)

A computer search of 395 barley varieties listed 2 varieties besides the application -- 'Harlan II' and 'Florida 102'. 'Harlan II' and 'Reliance' are adapted to the same areas. 'Harlan II' is a tall variety which is midseason to late in maturity. (Ariz. Ext. Serv. Bull. A-15. Oct. 1973) 'Reliance' is a semidwarf variety which is early maturing. (Exhibits B & C of application)

'Florida 102' is a tall variety with nodding heads. It is resistant to spot blotch (Helminthosporium sativum). (Fla. AES Circular S-181, Sept. 1967; Texas AES Circ. B-1087, Aug. 1969) 'Reliance' is a semidwarf variety with upright heads and is susceptible to spot blotch. (Exhibit B & C of application)

APPLICATION NO. 7700004, 'Reliance' barley

STATEMENT FOR JOURNAL

'Reliance' is most similar to 'CM 67' but differs in that 'Reliance' flowers and matures an average of 5 days later, is 15 cm shorter and has stronger straw which is more resistant to lodging than 'CM 67'. 'Reliance' has brownish thin hulls and dark blue aleurone color while 'CM 67' has white hulls and white aleurone color.